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Promotion of new and renewable sources of energy, including the implementation of the World Solar Programme 1996-2005

Report of the Secretary-General

Summary

Concerns over five issues have strengthened the motivation to increase the use of new and renewable sources of energy: poverty elimination, climate change, localized pollution, increased energy demand and eventual fossil-fuel depletion. The Plan of Implementation of the World Summit on Sustainable Development (WSSD) calls for substantially increasing, on an urgent basis, the global share of energy obtained from renewable sources. The United Nations and its relevant member organizations, other international organizations, national Governments, private corporations and non-governmental organizations are currently engaged in promoting new and renewable sources of energy, including the World Solar Programme 1996-2005. The partnerships for sustainable development resulting from the WSSD process have contributed significantly to the increased interest in renewable sources of energy. The World Solar Programme 1996-2005 has now become a tool for implementing the WSSD Plan of Implementation. Prospects for accelerating the development, dissemination, utilization and commercialization of new and renewable sources of energy have become markedly more optimistic in the past two years.

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I. Introduction

1. The General Assembly, in its resolution 53/7, endorsed the World Solar Programme 1996-2005 as contributing to the achievement of the goals of sustainable development and, in its resolutions 54/215, 55/205 and 56/200, called for further action to ensure that this Programme is fully integrated into and brought into the mainstream of the efforts of the United Nations system towards attaining the objective of sustainable development. In resolution 56/200 the General Assembly reiterated that mutually supportive efforts at the national and international levels were imperative in the pursuit of sustainable development, which included, inter alia, the provision of financial resources and the transfer of technology for the application of cost-effective energy and the wider use of environment-friendly, renewable sources of energy, and acknowledged that the Commission on Sustainable Development (CSD) and the Economic and Social Council continued to play a pivotal role as forums for the discussion of new and renewable sources of energy and sustainable development, and welcomed the recommendations of the Commission at its ninth session, in particular the references to renewable energy.

2. The General Assembly also took note with appreciation of the report of the Secretary-General on concrete action being taken for the promotion of new and renewable sources of energy, including the implementation of the World Solar Programme 1996-2005 (A/56/129). It also invited the international community to support, as appropriate, including by providing financial resources, the efforts of developing countries to move towards sustainable patterns of energy production and consumption. The Assembly called again upon all relevant funding institutions and bilateral and multilateral donors, as well as regional funding institutions and non-governmental organizations, to support, as appropriate, the efforts being made for the development of the renewable energy sector in developing countries on the basis of environment-friendly, renewable sources of energy of demonstrated viability, while taking fully into account the development structure of energy-based economies of developing countries, and to assist in the attainment of the levels of investment necessary to expand energy supplies beyond urban areas.

3. In expressing its appreciation for the continued efforts of the Secretary-General in bringing the World Solar Programme 1996-2005 to the attention of relevant sources of funding and financial assistance, the General Assembly encouraged the Secretary-General to continue his efforts to promote the mobilization of adequate technical assistance and funding and to enhance the effectiveness and the full utilization of existing international funds for the effective implementation of national and regional high-priority projects in the area of renewable sources of energy. The Assembly recognized that the wider use of available renewable energy technologies required the diffusion of available technologies on a global scale, including through North-South and South-South cooperation, and emphasized the need to intensify research and development in support of energy for sustainable development, which would require increased commitment on the part of all stakeholders, including Governments and the private sector, to deploy financial and manpower resources for accelerating research efforts.

4. The General Assembly requested the Secretary-General, in consultation with the United Nations Educational, Scientific and Cultural Organization (UNESCO) and in cooperation with the United Nations Development Programme (UNDP), the Global Environment Facility (GEF), the United Nations Environment Programme

(UNEP) and other relevant organizations, to submit to it, at its fifty-eighth session, a report on concrete action being taken for the promotion of new and renewable sources of energy, including the effective implementation of, and mobilization of resources for, the World Solar Programme 1996-2005. The present report has been prepared pursuant to that request.

II. Background

5. The importance attached to increasing the use of renewable sources of energy arises from concerns over five issues. The most urgent concern is for the more than 2 billion people currently without access to modern energy services, most of whom live in rural areas where they rely on non-commercial energy sources, such as biomass, firewood, charcoal and animal waste. Burning of these materials, often in open indoor fires, seriously affects the health of women and children in particular. Achievement of the Millennium Development Goal of halving, by 2015, the proportion of the world's population whose income is less than one dollar per day will depend on providing this population with access to modern energy services for their needs and for income generation. For widely dispersed rural populations of low density, decentralized energy technologies based on renewable sources provide a viable alternative to expensive grid extensions. Decentralized renewable energy systems constitute a valuable component of poverty eradication efforts.

6. Also of considerable urgency is the need to reduce the emission of greenhouse gases, which are primarily associated with fossil-fuel extraction and use. Of primary importance are carbon dioxide emission from the combustion of fossil fuels, and the release of methane during the extraction of natural gas, oil or coal, and the transport of natural gas. The third assessment report of the Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2001: The Scientific Basis*, attributes a significant portion of the increase in average global temperature observed over the past 50 years to increasing atmospheric concentrations of greenhouse gases resulting from human activities.[1] The thinning of Arctic ice, retreat of glaciers and sea-level rise that have been reported are predictable manifestations of global warming.

7. There are also serious concerns about localized pollutants emanating from fossil-fuel use, including sulphur and nitrogen oxides, carbon monoxide and suspended particulate matter. Variously, these gases contribute to depletion of the stratospheric ozone layer and acid precipitation, as well as to increased incidents of ill health and death. Replacing fossil fuel with renewable sources of energy greatly reduces and often completely eliminates the emission of greenhouse gases and localized pollutants associated with fossil-fuel combustion.

8. A major issue continues to be the need for more energy from all sources, including renewable sources, particularly for the developing nations, which are faced with rising energy demand associated with the twin pressures of significant per capita economic development and increasing populations.

9. Finally, the persistent warning of the ultimate depletion of economically recoverable quantities of fossil fuels, especially oil, but also natural gas and eventually coal as well, cannot be dismissed. It raises the issue of the need to begin phasing into the energy supply mix renewable sources, which can ultimately replace depletable fossil fuels.

10. As a result of concerns for these issues, the international community has gradually come to recognize the importance of developing and utilizing renewable sources of energy. Since the World Solar Programme 1996-2005[2] was launched as an instrument at the service of the international community for the promotion and enhanced utilization of environment-friendly, renewable sources of energy, this recognition has, in particular, led to a major emphasis on renewable energy for achieving the objectives of sustainable development.

III. Relation to sustainable development and the Plan of Implementation of the World Summit on Sustainable Development

11. Renewable energy was included in the deliberations of the ninth session of the Commission on Sustainable Development (CSD) (New York, 16-27 April 2001) and was highlighted as a means of making energy systems more supportive of sustainable development objectives.[3] In particular, the Commission recommended that Governments develop energy services, particularly in rural areas, through, inter alia, where appropriate, the development of renewable energy sources, support for increased use of renewable energies both in grid-connected and decentralized systems, development of appropriate policies and programmes to increase the contribution of renewable energies to total energy consumption, and promotion of the utilization of renewable natural resources such as solar, wind, biomass, geothermal, hydro, including mini-hydro, and ocean energy to meet part of the energy needs for sustainable development. It further recommended the development and implementation of measures to make renewable energy technologies more affordable and strengthening financial support to developing countries for the promotion of renewable energy.

12. As a result of the deliberations of the ninth session of the Commission, renewable energy figured prominently in the preparations for and the deliberations of the World Summit on Sustainable Development (WSSD) (Johannesburg, 26 August-4 September 2002).[4] The actions called for in the Plan of Implementation emanating from the World Summit include a major focus on energy, including energy from renewable sources, on poverty eradication, on changing unsustainable patterns of consumption and production, and on the sustainable development of regions, including small island developing States and Africa.

13. In addressing the contribution that renewable energy can make to poverty eradication and in support of the Millennium Development Goal of halving, by 2015, the proportion of the world's population whose income is less than one dollar per day, the WSSD Plan of Implementation calls for: (a) increased use of energy from renewable sources as one means to improve access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services and resources; (b) improved access to modern biomass technologies and sustainably managed fuelwood sources and supplies, and commercialized biomass operations in rural areas and where such practices are sustainable; and (c) improved patterns of use through better management of resources, more efficient use of fuelwood and new or improved products and technologies, aimed at promoting sustainable use of biomass and, as appropriate, other renewable energies.

14. With regard to the need to change unsustainable patterns of consumption and production, the Plan of Implementation calls for substantially increasing, on an urgent basis, the global share of energy obtained from renewable sources with the objective of increasing its contribution to the total energy supply to meet the growing need for energy services in the longer term in order to achieve sustainable development. In support of diversifying the energy supply, the Plan of Implementation points out the need for: (a) developing and disseminating alternative energy technologies, including advanced, cleaner, more efficient, affordable and cost-effective renewable energy technologies, including hydro; (b) developing and utilizing indigenous energy sources and infrastructures for various local uses, and promoting rural community participation in developing and utilizing renewable energy technologies to meet daily energy needs; (c) support by international financial institutions and other agencies to developing countries, as well as countries with economies in transition, in their own efforts to establish policy and regulatory frameworks that create a level playing field among renewable and other energy technologies; (d) promoting increased research and development in the field of renewable energy; (e) utilizing financial instruments and mechanisms, in particular the Global Environment Facility, within its mandate, to provide financial resources to developing countries, in particular least developed countries and small island developing States, to meet their capacity needs for training, technical know-how and strengthening national institutions in promoting renewable energy; and (f) efforts by countries to develop and implement actions within the framework of the ninth session of the Commission on Sustainable Development, including through public-private partnerships, in the field of access to energy, including renewable energy.

15. Specifically for the small island developing States, the Plan of Implementation calls for developing and promoting the efficient use of indigenous sources and renewable energy to support the availability of adequate, affordable and environmentally sound energy services for the sustainable development of these States. The Plan of Implementation also calls for support for initiatives to increase the use of renewable energy, particularly in rural and peri-urban areas, to support the efforts of African nations to achieve the goals of the New Partnership for Africa's Development (NEPAD), one of which seeks to secure access to energy for at least 35 per cent of the African population within 20 years, especially in rural areas.

16. Thus, because of the importance of energy issues to sustainable development and the positive contribution that new and renewable sources of energy can make to achieving the objectives of sustainable development, the efforts of the international community, especially through the Commission on Sustainable Development and the World Summit on Sustainable Development, have accelerated the promotion of the development and utilization of new and renewable sources of energy. In addition to the efforts of national Governments, international organizations and non-governmental organizations in implementing the Plan of Implementation, the World Summit on Sustainable Development has also drawn in other stakeholders, in particular the private sector through public-private partnerships.

IV. International efforts to promote new and renewable sources of energy

17. Efforts to promote new and renewable sources of energy are being carried out at the international level by the United Nations and its member organizations, the World Bank and the Global Environment Facility, other international organizations such as the International Energy Agency, non-governmental organizations such as the International Solar Energy Society, and partnerships that include these organizations, private corporations and national Governments. As a result of the significant increase in activities in this area, due in part to efforts to achieve the objectives of sustainable development, it is possible to provide here only a summary of these activities.

18. As the initiator of the World Solar Programme 1996-2005, the United Nations Educational, Scientific and Cultural Organization (UNESCO) has provided the world community with an instrument for the promotion of renewable sources of energy. In furthering the implementation of the World Solar Programme 1996-2005, UNESCO continues to pursue its two-fold strategy in the field of renewable energy consisting of (a) stimulating advocacy and investment mobilization, and promoting education, training and information efforts, and (b) encouraging regional cooperation through networking and assistance to its member States in defining their national and regional strategies in this area. It also plays an advocacy role in promoting renewable energy technologies for sustainable development through the provision of advisory services aimed at developing capacity-building and sound energy policies. UNESCO implements these activities in conjunction with its field offices to address national and regional needs and priorities.

19. In support of efforts to develop national competencies to enhance the use of renewable sources of energy, UNESCO continues to provide support and technical assistance to its member States towards enhancing policy making, and the planning of projects and programmes, as well as the implementation of priority projects. In particular, UNESCO continues to assist the task force established to restructure the World Solar Commission. The task force has finalized statutes that specify the adoption of a new name, the "World Commission on Renewable Energy", and the re-establishment of this Commission as an autonomous organization. Similarly, UNESCO has provided assistance to the African Energy Commission (AFREC) for the elaboration of a comprehensive energy information system for Africa and the establishment of an AFREC energy database.

20. UNESCO is continuing to implement the Global Renewable Energy Education and Training (GREET) programme, with particular emphasis on its African chapter. The aim of the programme is to improve the use, maintenance and management of solar energy projects and programmes, as well as the transfer of technical know-how, through university teaching, continuing and distance education, and other education and training activities for such professionals as: decision makers, policy makers, researchers, engineers, university instructors and technicians. Brochures, textbooks, and learning and teaching packages on renewable energy technologies have been prepared, field-tested and disseminated. In the context of the African chapter, a newly conceived Mobile Solar Library has been designed and implemented in Zimbabwe. This constitutes an adapted tool for combating illiteracy, as well as a contribution to improving the living conditions of the rural population. To further strengthen capacities for renewable energy technologies, UNESCO

organized a regional training workshop entitled "Photovoltaic (PV) Systems for Decentralized Rural Electrification" in Dar es Salaam, Tanzania, in February 2002, another such workshop entitled "Renewable Energy, Electrification and Cogeneration" in Yaounde, Cameroon, in December 2002, and a training course entitled "Rural Electrification by Solar Hybrid Generation using Renewable Energy" in Quito, Ecuador, in November 2001. Seventy experts benefited from the training workshops in Africa. In cooperation with the European Commission and the Catalan Institute for Energy (ICAEN), the latter activity was carried out as a follow-up to the solar electrification by UNESCO of three schools in the Galapagos Islands, Ecuador. Moreover, UNESCO has launched a publication series on various topics related to the technologies, applications and maintenance of renewable energy systems.

21. In association with multilateral partners and national specialized institutions, UNESCO is promoting the wider use of renewable sources of energy through bilateral and regional cooperation with the organization and launching of regional forums for renewable energy sources. Thus, a meeting of the Secretaries-General of National Commissions for UNESCO of the Southern African Development Community (SADC) countries was held in Harare, Zimbabwe, in October 2001 to inform national representatives on the progress and achievements made in implementing the African Charter of the Global Renewable Energy Education and Training Programme, and to discuss the way forward in implementing the programme and in formulating national and regional action plans related to education and training in renewable energy. In addition, other forums were held for the Caribbean region in Havana, Cuba, in November 2002 and in the Mediterranean region in Marrakech, Morocco, in April 2003 to identify modalities for regional cooperation and partnership, define national and regional action plans and future activities, and identify financing opportunities for projects using efficient renewable energy technologies for sustainable development. These constitute concrete initiatives to assist UNESCO member States in mobilizing resources and identifying financial opportunities in the field of renewable energy by facilitating contacts among decision makers, policy makers, local authorities, investors, financial institutions, industrialists, electricity utilities, programme managers, researchers and other professionals.

22. UNESCO also actively contributed to and participated in an international symposium on wind energy held in Nouakchott, Mauritania, in January 2003. The substantive foundation for the meeting was provided by working documents prepared jointly by UNESCO and the Institut de l'énergie et de l'environnement de la Francophonie (IEPF) on education and training, decentralized rural electrification and environmental protection, and renewable energy for development. A document on mechanisms of implementation was drafted and provided to national authorities in Africa.

23. As a follow-up to the Plan of Implementation of the World Summit on Sustainable Development and taking into consideration the Millennium Development Goals, UNESCO and the Institut de l'énergie et de l'environnement de la Francophonie launched an international network for sustainable energy in June 2003. This network will provide a framework for developing partnerships, joint programmes and projects, and the exchange of information, know-how and experience in the field of renewable energy. Similarly, in collaboration with the International Scientific Council for Island Development (INSULA) and the European Renewable Energy Council, UNESCO organized a forum on "Island

Authorities and Sustainable Tourist Destinations in Favour of Renewable Energies and Clean Water Production" in May 2003. The objective of this forum was to bring together renewable energy technology experts and decision makers and policy makers of island nations to identify suitable applications for renewable energy systems, so as to introduce renewable energy applications for sustainable island management, particularly with regard to tourism.

24. The Department of Economic and Social Affairs (DESA) of the United Nations Secretariat is continuing to undertake a number of initiatives to assist countries in the development and utilization of renewable energy, in cooperation with other United Nations bodies, other international organizations, donors, the private sector and non-governmental organizations. In this direction, DESA has signed a memorandum of understanding with the E7 group of leading utilities in the major industrialized nations with a major focus on providing assistance to developing nations in the area of renewable energy.

25. With combined funding from the Global Environment Facility (GEF) and the Governments of Australia, China and the Netherlands, a five-year project in China to remove barriers to the rapid commercialization of renewable energy is midway through implementation. Designed to promote renewable energy technology development and a commercial renewable energy technology industry, the project provides training, workshops, demonstration installations, business development, policy facilitation, equipment standards, company and product certification, and overall industry support. The project focuses on (a) village-scale power for household electrification and rural industry, using hybrid wind-solar photovoltaic systems with battery storage and back-up diesel generators, (b) industrial-scale biogas development using industrial and agricultural organic waste effluents, (c) solar water heating systems for buildings, (d) wind power development for grid-based power generation, (e) bagasse-fuelled cogeneration in the sugar industry with grid-based generation, and (f) the development of a national testing and certification programme for the solar water heating industry in China. As part of its market-oriented approach, the project has established and is strengthening the China Renewable Energy Industry Association, is compiling a portfolio of bankable renewable energy projects within an investment opportunity facility, and is creating a geographic information system for solar and wind resource data.

26. In cooperation with Winrock International and Winrock International India, DESA is mid-way through implementing a three-year project on commercializing renewable energy in India with financial support from the United Nations Foundation and the W. Alton Jones Foundation. The aim of the project is to strengthen local entrepreneurial capacity for the sustained commercial operation of small-scale energy enterprises that harness renewable sources to provide energy services for productive applications. The target region for the project is approximately 5,700 villages (about 12.2 million persons) in a semi-arid tropical region in the state of Andhra Pradesh. The project team is working through such intermediaries as micro-credit institutions, self-help groups and scheduled caste and tribal organizations to facilitate the development of entrepreneurial talent. Also with support from these donors, DESA completed a project with Carnegie Mellon University of Pittsburgh, PA, USA, and four leading Indian energy and engineering institutions to address some of the technical and policy issues that have hindered the widespread utilization of advanced biomass conversion technology in rural areas of developing countries. The project has demonstrated the technical viability,

commercial competitiveness and environmental compatibility of biomass-fuelled electricity generation systems with generation capacities between 100 and 500 kW for use in rural India.

27. Under a trust fund established by the Government of Italy, assistance is also provided by DESA to small island developing States for projects to promote solar lighting in homes, schools and community centres and for such solar-operated equipment as radios, televisions and medical refrigerators. In addition to five previously completed projects, another was completed in Marshall Islands and two others are under implementation in Fiji and Papua New Guinea. Also under this trust fund, a project to provide passive solar housing as part of the post-conflict reconstruction effort in Somalia has been completed. The project included the training of returning refugees in the design and construction of vault and dome buildings using sun-dried mud bricks and passive solar design principles. Since the completion of the project, these newly trained masons have been employed under a UNDP-funded pilot project to build 72 passive solar homes for returning refugees.

28. In close cooperation with the Government of Syria and with funding and support provided by UNDP, DESA has developed a national renewable energy master plan for Syria. In identifying areas where renewable energy can make a significant contribution to the national energy budget, the master plan contains concrete proposals for wind, biomass, solar, hydro and hybrid energy systems, as well as accompanying measures that provide for institution building, capacity-building and market studies. UNDP is working with the Ministry of Electricity to organize financing to implement concrete measures in the plan.

29. The Global Environment Facility, through its three implementing agencies (the World Bank, UNDP and UNEP), continues to provide significant levels of financing for renewable energy projects in developing countries. Total funds mobilized for these projects have exceeded $6 billion, because GEF grants have also leveraged significant financing and other resources from Governments, other donor agencies, regional development banks, implementing agencies, and the private sector. These renewable energy projects fall into two categories: those aimed at removing barriers to markets for commercial or near-commercial technologies, and those for reducing long-term technology costs through research, demonstration and commercialization. The Facility seeks to involve and support the private sector and promote commercial and sustainable markets for a variety of renewable applications, with the overarching goal of developing sustainable private markets to expand the use of renewable energy in developing countries and maximize the social, economic and environmental benefits this can bring. GEF renewable energy projects involve private firms as manufacturers and dealers, local project developers, financial intermediaries, recipients of technical assistance, technology suppliers and contractors, and project executors. Private project developers, for example, receive financing and technical assistance, while also benefiting from improved regulatory frameworks.

30. Examples of GEF-financed projects include support for: the application of a low-cost technology to convert agricultural waste to cooking gas in rural China; financing and training for the sale and servicing of small solar energy systems in rural areas of Ecuador, Ghana, India and Indonesia; a biomass plantation project in Senegal; the installation of solar thermal power plants in Egypt, India, Mexico and Morocco; demonstrating market expansion opportunities for solar photovoltaic

technology in the Philippines; and the application of modern technologies to generate electricity from bagasse in Brazil and Mauritius. The Global Environment Facility has launched long-term project approaches, such as a new 10-year project to remove market barriers to private sector development for approximately 70 megawatts of biomass, hydro, and solar energy systems in Uganda, and a similar project in China aimed at achieving a national goal of 5 per cent of power generation from renewable energy sources by 2010.

31. The renewable energy activities of the United Nations Development Programme (UNDP) are extensive with about 70 per cent of its country offices in developing countries and countries with economies in transition reporting work on sustainable energy, with the major area of focus being renewable energy. Thanks to its role as an implementing agency of the Global Environment Facility and through its Thematic Trust Fund on Energy for Sustainable Development, UNDP has a growing portfolio of activities that focus on making modern energy technologies available to addressing both local development needs and global environmental protection, but with strong links to enhanced rural energy services, national policy development and financing facilitation.

32. As part of the preparatory process for the World Summit on Sustainable Development, UNDP and the World Bank launched a Global Village Energy Partnership that emphasizes increasing access to energy services and poverty reduction. With a worldwide scope, the partnership aims to provide access to modern energy services to about 400 million people who were previously unserved, including over 50,000 communities. By bringing together Governments, donors, public and private organizations, multilateral institutions, energy consumers and others, the partnership will reach out to non-energy organizations in the health, education, agriculture, water, transport, telecommunications and enterprise sectors to offer a range of energy technologies to meet their needs. Renewable energy technologies are prominent in the range of energy options to be utilized. The partnership will offer assistance in financing facilitation, capacity-building and knowledge management.

33. Working with a wide range of partners, the United Nations Environment Programme (UNEP) addresses the environmental consequences of energy production and use such as global climate change and local air pollution, and assists decision makers in government and the private sector make better and more informed energy choices that fully integrate environmental and social costs, with an emphasis on renewable energy. Its Rural Energy Enterprise Development initiatives have been effective in launching clean energy enterprises that apply best-practice approaches to the supply of sustainable energy services. Most of the 11 enterprises launched in Africa focus on renewable energy technologies, as do most of the 25 enterprises receiving assistance in Brazil and as will the enterprises being launched in north-west and western China. With support from the United Nations Foundation and Shell Foundation, UNEP is assisting an Indian solar credit facility to help commercial banks make loans for solar photovoltaic systems. A vendor qualification process and bank training programme are included in this effort. As part of a partnership with the Government of Italy, UNEP has launched a project to investigate options for increasing financial flows to renewable energy projects in the Mediterranean region. UNEP has produced a number of publications on renewable energy technologies.

34. UNEP has launched a Global Network on Energy for Sustainable Development, which promotes sustainable energy development through policies and actions that expand access to environmentally sound energy services, primarily from renewable sources. The network is helping to develop and apply knowledge through collaborative analytical studies, policy support, capacity development and information exchange. The network links centres in developing countries with a demonstrated capacity for work on energy, development and environment issues.

35. Collaborating agencies have begun work on the UNEP Solar and Wind Energy Resource Assessment project. National agencies are gathering ground measurement data and are receiving training, and technical assistance agencies have begun modelling solar and wind resource potential in order to make available more accurate data on solar and wind energy availability that can serve as a basis for investment in renewable energy projects.

36. The United Nations Industrial Development Organization (UNIDO) promotes the development of renewable energy technologies, including sustainable biomass, solar, wind, and mini-hydro energy. Its technical assistance in these areas supports a broad series of initiatives at the policy, institutional and enterprise levels to provide a solid foundation for the widespread introduction of renewable energy technologies. These initiatives include capacity-building related to renewable energy technology, and the assembly and manufacture of equipment in developing countries. A specialized International Centre for the Application of Solar Energy is functioning in Australia to provide rapid and cost-effective support and advice on solar energy technologies and market advice for entrepreneurs seeking to invest in solar and other renewable energy industries. UNIDO is also working to raise awareness of new and innovative ways of financing more efficient power-generating capacity, particularly for hydropower projects in Latin America.

37. At the policy level, the Food and Agriculture Organization of the United Nations (FAO) continues to address the linkages between energy in general, and renewable energy in particular, with rural economic activity in order to promote growth and poverty alleviation. FAO is launching a new strategy on bioenergy that has a wood energy component and an agro-energy component. This strategy is designed to consolidate efforts related to the critical situation of traditional biomass in many rural areas of developing countries, and to promote the entry of modern biomass energy conversion, such as agricultural and forestry sub-products and, more specifically, energy crops. In cooperation with UNDP, FAO has assisted the Government of Niger in the formulation of a national strategy and plan of action for renewable energy use in rural areas. Following adoption of the strategy and plan by the Government, the approach is being discussed with other countries in the region. FAO continues to promote the application of biomass, solar and wind energy systems in rural areas, with the design and promotion of productive uses of renewable energy an important area of focus.

38. The World Meteorological Organization (WMO) promotes sustainable energy production and use in several programmes, including the provision of guidance material and training seminars, focusing on the use of climate information in the development and operation of renewable energy systems based on biomass, hydro, solar and wind energy resources. A major focus of WMO programmes is the provision of guidance material and capacity-building for the needs and requirements for services in the energy sector.

39. Extensive programmes that promote the development and use of renewable sources of energy are also being implemented by several of the United Nations regional economic commissions, including the Economic Commission for Latin America and the Caribbean (ECLAC), the Economic and Social Commission for Asia and the Pacific (ESCAP) and the Economic and Social Commission for West Asia (ESCWA). The focus of ECLAC is on preparing studies on the potential and use of new and renewable sources of energy in the region and promoting specific energy sources, and supporting training seminars and courses on relevant aspects of energy development, planning and regulation. ESCAP is continuing to promote greater awareness of renewable energy technologies and their potential, and to enhance capacity-building through the organization of seminars, workshops and projects to share experiences and know-how. One project on capacity-building for the integration of energy and rural development planning supports the efforts of Governments to meet the energy needs of rural populations through increased utilization of locally available renewable energy resources, in particular biomass. Renewable energy is a core activity of ESCWA, which has developed a regional approach for disseminating renewable energy technologies and support activities for water desalination, rural electrification and capacity-building. In addition, ESCWA provides advisory services and technical cooperation and produces publications on renewable energy issues. With the increased importance given to regional activities in the Plan of Implementation adopted by the World Summit on Sustainable Development (WSSD), it is expected that future renewable energy activities of the regional commissions will be more extensive.

40. The WSSD process generated a number of partnerships involving Governments, international organizations, the private sector, and non-governmental organizations. By drawing on the additional financial resources and expertise of the private sector and the expertise and contacts of the non-governmental organizations, it is expected that these partnerships will significantly expand the scale of dissemination and utilization of renewable energy technologies, particularly in developing countries. Of the 23 partnerships for sustainable development registered under the energy category with the Department of Economic and Social Affairs of the United Nations Secretariat, 12 are devoted to or have a major focus on renewable energy. In addition to the Global Village Energy Partnership led by UNDP and the World Bank, and the Global Network on Energy for Sustainable Development led by UNEP, these partnerships are: the Business Alliance for Solar Water Heaters led by Jacques Giordano Industries (France); the Development Strategies to Promote Rural Energy Systems partnership, led by UNIDO; the Energy and Environment Partnership with Central America, led by the Ministry of Foreign Affairs of Finland and the Comisión Centroamericana de Ambiente y Desarrollo; the Indonesia-French Public and Private Partnership to Develop Mini-Hydro Power in Rural/Remote Areas on a Sustainable Basis, led by the Ministry of Energy and Mineral Resources of Indonesia; the Market Facilitation Partnership for Concentrating Solar Power Technologies, led by the UNEP-GEF Technology Transfer Networks; the Mechanism for the Development of Renewable Energy and Energy Efficiency in Developing Countries, led by the Development Agency of the Government of France; the Mediterranean Renewable Energy Programme, led by the Government of Italy; the Modern Biomass Technology for Rural Energy Needs partnership, led by the Centre de cooperation international en recherche agronomique pour le developpement (CIRAD) (France); the Renewable-Energy-Based Rural Electrification Initiative, led by the Pacific International Center for

High Technology Research (United States of America); and the Renewable Energy and Energy Efficiency Partnership of the Government of the United Kingdom.

41. In addition, there are other major initiatives that have resulted from the WSSD process. One of these is the Johannesburg Renewable Energy Coalition of 82 member States, with the European Commission as its secretariat. Another is the decision announced at the Summit by the German Federal Chancellor that the Government of Germany will host the International Conference for Renewable Energy in Bonn, Germany, in June 2004. This conference will be another vehicle for promoting new and renewable sources of energy that can be expected to produce substantial results.

42. Moreover, the continuing promotional activities of professional non-governmental organizations should not be overlooked. Such organizations as the International Solar Energy Society and the European Wind Energy Association offer an important pool of professional expertise and experience upon which the international community can draw in developing, disseminating, applying and promoting renewable energy technologies.

V. Conclusion: Prospects for the future

43. **The actions at the international level described in section IV above indicate a significant acceleration of interest in and support for the development and utilization of new and renewable sources of energy. Not only have the number of actions and their magnitude increased, but the number of actors has expanded significantly, primarily through the process that led to and resulted from the WSSD, and the types of activities are more varied and innovative. The introduction of the Partnerships for Sustainable Development initiative has generated substantial interest in renewable energy technologies and is expected to lead to major advances in the dissemination and utilization of these technologies. Other notable developments were the establishment of the Johannesburg Renewable Energy Coalition and the decision by the Government of Germany to host the International Conference for Renewable Energy in Bonn, Germany, in June 2004.**

44. **It is also evident that the Plan of Implementation of the World Summit on Sustainable Development has come to incorporate the actions involved in the implementation of the World Solar Programme 1996-2005, which can now be seen as a tool for implementing the Plan of Implementation.**

45. **The eleventh session of the Commission on Sustainable Development (New York, 28 April-9 May 2003) adopted "energy, industrial development and climate change" as the cluster theme for its second cycle (2006-2007). It is expected that the increasing development and utilization of renewable energy will be one of the key issues for review of the implementation of the WSSD Plan of Implementation.**

46. **Thus, while challenges and obstacles to the promotion of new and renewable sources of energy remain, the situation in the past two years has changed markedly and there is justification for guarded optimism. The importance of further increasing the financial resources available to developing, disseminating, applying and commercializing new and renewable**

sources of energy cannot be overlooked. Moreover, the initiatives that have been launched through the World Summit on Sustainable Development have yet to demonstrate their effectiveness. However, the twin concerns of poverty elimination and climate change have produced an unprecedented level of interest in new and renewable sources of energy that it can only be hoped will lead to a commensurate level of practical results.

Notes

[1] Report of the Secretary-General, *Protection of the Atmosphere* (E/CN.17/2001/2).

[2] The term "solar" is used herein in a generic sense and refers to all forms of renewable energy including the solar thermal, solar photovoltaic, biomass, wind, mini-hydro, tidal, ocean and geothermal forms.

[3] Commission on Sustainable Development, Report on the ninth session (5 May 2000 and 16-27 April 2001) E/2001/29 (E/CN.17/2001/19).

[4] Report of the World Summit on Sustainable Development, A/CONF.199/20* (2003).